## **Overview**

This document contains the test cases and test results of Edge28 device.

## **Test Plan**

1. Schedule
   1. Start date: 2021-11-19
   2. End Date: 2021-11-19
2. Test case scope:
   1. Installation: A1 - A2
   2. Connection: B1 - B2
   3. VPN Tunnel Quality: C1 - C3
   4. Configuration Validity: D1 - D2
3. Testers
   1. Ronnel

## **Test Environment**

1. NUT (Node Under Test)

Name: Edge28

Platform: Linux beaglebone 4.14.49-ti-r54

IP/URL: ssh debian@123.209.253.79 -p 2116

1. TN (Test Node)

Name: Cloud server

IP/URL: 178.128.106.232

1. VPN Monitoring Site

IP/URL: https://openvpn.nube-iiot.com

## **Test Cases**

A. Installation

| Test Case# | A1 |
| --- | --- |
| Title | Install the OpenVPN client configuration for the first time |
| Description | Install the OpenVPN client software and configuration into the Edge28 device that has not been set up yet. This is a fresh installation. |
| Prerequisite |  |
| Procedure | 1. Boot up the Edge28 device. 2. Get the Edge28 device IP address and SSH username/password. 3. Get or assign the Edge28 device name (something unique like UUID or hostname). 4. SSH into the VPN server as root. 5. Generate and install the Edge28 OpenVPN client configuration using the gvcf program (/usr/local/bin/gvcf). 6. Check the list of online clients in the VPN Monitor (<https://openvpn.nube-iiot.com>). 7. From the VPN server, SSH to the edge28 device through the assigned VPN IP address. |
| Expected Results | 1. Edge28 device reboots after installing the OpenVPN client configuration.. 2. Edge28 device is listed as online in the VPN Monitor. 3. User is able to SSH to the edge28 device through the VPN IP address. |
| Actual Results | 1. Failed to install openvpn package on Edge28. 2. System apt-update requires manual fixing. Previous updates may have caused inconsistencies in the system package versions. |
| Pass / Failed | **FAILED** |

| Test Case# | A2 |
| --- | --- |
| Title | Overwrite existing OpenVPN client configuration |
| Description | Overwrite the existing OpenVPN client configuration of the Edge28 device. |
| Prerequisite |  |
| Procedure | 1. Boot up the Edge28 device. 2. Get the Edge28 device IP address and SSH username/password. 3. Get or assign the Edge28 device name (something unique like UUID or hostname). 4. Check the Edge28 device VPN client name and expiration date from the VPN monitor. Take note of the client name expiration date. 5. SSH into the VPN server as root. 6. Generate and install the Edge28 OpenVPN client configuration using the gvcf program (/usr/local/bin/gvcf). 7. Check the list of online clients in the VPN Monitor (<https://openvpn.nube-iiot.com>). Compare the expiration date of the Edge28 device. 8. From the VPN server, SSH to the edge28 device through the assigned VPN IP address. |
| Expected Results | 1. Edge28 device reboots after installing the OpenVPN client configuration.. 2. Edge28 device is listed as online in the VPN Monitor with an updated expiration date. 3. User is able to SSH to the edge28 device through the VPN IP address. |
| Actual Results | 1. New configuration installed into Edge28 device. 2. Edge28 device connected to VPN server after restart. |
| Pass / Failed | **PASSED** |

B. Connection

| Test Case# | B1 |
| --- | --- |
| Title | Edge28 device automatically connects to the VPN server on startup |
| Description | The Edge28 device automatically connects to the VPN server on startup. |
| Prerequisite | 1. Performed TC A1 or A2. |
| Procedure | 1. Check the list of online clients in the VPN Monitor. Take note of the VPN IP address and client name of Edge28. 2. Restart or reboot the Edge28 device. 3. From the VPN server, SSH to the edge28 device through the assigned VPN IP address. |
| Expected Results | 1. Edge28 device restarts. 2. Edge28 device is listed as online in the VPN Monitor. 3. User is able to SSH to the edge28 device through the VPN IP address. |
| Actual Results | 1. Edge28 device connected to VPN server after restart. |
| Pass / Failed | **PASSED** |

| Test Case# | B2 |
| --- | --- |
| Title | Edge28 device automatically reconnects to the VPN server when the VPN tunnel is terminated |
| Description | The Edge28 device automatically reconnects to the VPN server when the VPN tunnel is terminated. |
| Prerequisite | 1. Performed TC A1 or A2. |
| Procedure | 1. Check the list of online clients in the VPN Monitor. Take note of the Edge28 device IP address and name. 2. Unplug the WAN cable (that connects to the Internet) of the Edge28 device. 3. Check the list of online clients in the VPN Monitor. Wait for 3minutes and refresh the page. 4. Plug back the WAN cable of the Edge28 device. 5. Check the list of online clients in the VPN Monitor. Wait for 3minutes and refresh the page. 6. From the VPN server, SSH to the edge28 device through the assigned VPN IP address. |
| Expected Results | 1. Edge28 device tunnel is terminated/removed after unplugging the WAN cable. 2. Edge28 device reconnects to the VPN server after the WAN cable is plugged back in. 3. User is able to SSH to the edge28 device through the VPN IP address. |
| Actual Results | 1. Edge28 device reconnected to the VPN server. To simulate disconnecting the WAN cable, I blocked OpenVPN connections to the VPN server. |
| Pass / Failed | **PASSED** |

C. VPN Tunnel Quality

| Test Case# | C1 |
| --- | --- |
| Title | No packet loss/error on VPN tunnel of Edge28 device |
| Description | No packet loss/error on VPN tunnel of Edge28 device for incoming and outgoing traffic. |
| Prerequisite | 1. Performed TC A1 or A2. 2. Prepare a 1GB size file on the VPN server. This can be created with a dd command. |
| Procedure | 1. From the VPN server, SSH to the Edge28 device through the assigned VPN IP address. 2. Run the command “ip -s link show tun0” and take note of the values of RX and TX errors and dropped counters. 3. Run the top common for 10 minutes. 4. Exit from SSH. 5. FTP or SCP the 1GB test file from the VPN server to the Edge28 device. 6. SSH to the Edge28 device and SCP back the 1GB test file to the VPN server. 7. Run the command “ip -s link show tun0” and compare the statistics from Step2. |
| Expected Results | 1. RX errors and dropped counters should be zero. 2. TX errors and dropped counters should be zero. |
| Actual Results | 1. Counters are all zero. |
| Pass / Failed | **PASSED** |

| Test Case# | C2 |
| --- | --- |
| Title | Edge28 VPN tunnel upload speed and capacity |
| Description | Edge28 VPN tunnel upload speed and capacity should match with the internet/network subscription rate |
| Prerequisite | 1. Performed TC A1 or A2. 2. Prepare a 1GB size file on the VPN server. This can be created with a dd command. 3. Get the internet/network subscription data rate speed. |
| Procedure | 1. Compute the MD5 hash of the 1GB test file. 2. From the VPN server, FTP or SCP the 1GB test file to the Edge28 device. 3. Get the time it took to upload the 1GB test file. 4. SSH to the Edge28 device and compute the MD5 hash of the uploaded file. |
| Expected Results | 1. The time and speed to upload the 1GB should match with the internet/network subscription data rate. 2. The MD5 hash of the uploaded file matches with the source file. |
| Actual Results | 1. Upload of 1G took 22mins at 800KB/s. 2. Uploaded file has the same MD5 as the source file. |
| Pass / Failed | **PASSED** |

| Test Case# | C3 |
| --- | --- |
| Title | Edge28 VPN tunnel download speed and capacity |
| Description | Edge28 VPN tunnel download speed and capacity should match with the internet/network subscription rate |
| Prerequisite | 1. Performed TC C2. 2. Get the internet/network subscription data rate speed. |
| Procedure | 1. From the VPN server, FTP or SCP the 1GB test file on the Edge28 device to the local folder. 2. Get the time it took to download the 1GB test file. 3. Compute the MD5 hash of the downloaded file. |
| Expected Results | 1. The time and speed to download the 1GB should match with the internet/network subscription data rate. 2. The MD5 hash of the download file matches with the source file. |
| Actual Results | 1. Download of 1G took 14mins at 1.2MB/s. 2. Downloaded file has the same MD5 as the source file. |
| Pass / Failed | **PASSED** |

D. Configuration Validity

| Test Case# | D1 |
| --- | --- |
| Title | Edge28 device with expired certificate |
| Description | Edge28 device with expired certificate must not be able to connect to the VPN server. |
| Prerequisite | 1. Performed TC A1 or A2. |
| Procedure | 1. Check the list of online clients in the VPN Monitor. Take note of the Edge28 device expiration date. 2. Login to the Edge28 device management interface/console and set the system date past the expiration date in Step1. 3. Restart the Edge28 device. 4. Wait for 5minutes. 5. Check and refresh the list of online clients in the VPN Monitor. Check if Edge28 device is in the list. 6. Access the Edge28 device management UI or console (outside the VPN). |
| Expected Results | 1. Edge28 device must not be able to connect to the VPN. 2. Edge28 device must be able to start and accessible (outside the VPN) even if not connected to the VPN. |
| Actual Results | 1. Edge28 device unable to connect to the VPN server. 2. Edge28 device able to start and be accessible. |
| Pass / Failed | **PASSED** |

## **Summary**

| Total Test Cases | Test Cases Passed | Passed % | Test Cases Failed | Failed % |
| --- | --- | --- | --- | --- |
| 8 | 7 | 87.5 | 1 | 12.5 |